CLAIMS

What we claim as our invention is:

[c1] 1. In a digital cinema system, a method of serializing frequency based image data, the method comprising:

compiling at least one group of data that may be represented as a16x16 block;

dividing the group of data into groups that may be represented as four 8x8 blocks;

serializing each of the four 8x8 blocks of data.

[c2] 2. The method set forth in Claim 1, wherein serializing comprises zig-zag scanning each of the four 8x8 blocks of data.

[c3] 3. The method set forth in Claim 1, wherein serializing comprises vertical scanning each of the four 8x8 blocks of data.

[c4] 4. The method set forth in Claim 1, wherein serializing comprises horizontal scanning each of the four 8x8 blocks of data.

[c5] 5. The method set forth in Claim 1, wherein compiling at least one group comprises compiling a frame of data that may be represented as a plurality of 16x16 blocks.

[c6] 6. The method set forth in Claim 1, where the frequency based image data is separated into Y, Cb and Cr color components.

[c7] 7. The method set forth in Claim 6, wherein the Y, Cb and Cr color components are further separated into even and odd color components.

[c8] 8. In a digital cinema system, a method of compressing a digital image, the image comprising pixel data, the pixel data separated into color components, the method comprising the acts of:

reading a group of a color component of pixel data;

generating a block size assignment to divide the group of a color component of pixel into sub-blocks of pixel data;

transforming the sub-blocks of pixel data into corresponding frequency domain representations; and

scaling the frequency domain representations into a stream of data, wherein the act of scaling is based on a quality metric correlating with the quality of the image;

compiling at least one group of data from the stream data that may be represented as a16x16 block;

dividing the 16x16 group of data into groups that may be represented as four 8x8 blocks; and

serializing each of the four 8x8 blocks of data.

[c9] 9. The method of claim 8, wherein the act of scaling further comprises the act of providing a frequency weighted mask to said sub-blocks of pixel data, such that the frequency weighting mask provides emphasis to the portions of the image that the human visual system is more sensitive, and provides less emphasis to the portions of the image that the human visual system is less sensitive.

[c10] 10. The method set forth in claim 8, wherein the act of scaling further comprises the act of quantizing the sub-blocks of pixel data based on the quality of the image.

[c11] 11. The method set forth in claim 8, wherein the quality metric is the signal to noise ratio.

[c12] 12. The method set forth in claim 8, wherein the act of transforming performs a Discrete Cosine Transform.

[c13] 13. The method set forth in claim 8, wherein the act of transforming performs a Discrete Cosine Transform followed by a Differential Quad-tree Transform.

[c14] 14. The method set forth in Claim 8, where the color components are Y, Cb and Cr color components.

[c15] 15. The method set forth in Claim 14, wherein the Y, Cb and Cr color components are separated into even and odd color components.

[c16] 16. In a digital cinema system, an apparatus for serializing frequency based image data, the apparatus comprising:

means for compiling at least one group of data that may be represented as a16x16 block;

means for dividing the group of data into groups that may be represented as four 8x8 blocks;

means for serializing each of the four 8x8 blocks of data.

[c17] 17. The apparatus set forth in Claim 16, wherein the means for serializing comprises means for zig-zag scanning each of the four 8x8 blocks of data.

[c18] 18. The apparatus set forth in Claim 16, wherein the means for serializing comprises means for vertical scanning each of the four 8x8 blocks of data.

[c19] 19. The apparatus set forth in Claim 16, wherein the means for serializing comprises horizontal means for scanning each of the four 8x8 blocks of data.

[c20] 20. The apparatus set forth in Claim 16, wherein the means for compiling at least one group comprises means for compiling a frame of data that may be represented as a plurality of 16x16 blocks.

[c21] 21. The apparatus set forth in Claim 16, where the frequency based image data is separated into Y, Cb and Cr color components.

[c22] 22. The apparatus set forth in Claim 21, further the Y, Cb and Cr color components are further separated into even and odd color components.

[c23] 23. In a digital cinema system, an apparatus of compressing a digital image, the image comprising pixel data, the pixel data separated into color components, the apparatus comprising:

means for reading a group of pixel data;

means for generating a block size assignment to divide the group of pixel into sub-blocks of pixel data;

means for transforming the sub-blocks of pixel data into corresponding frequency domain representations; and

means for scaling the frequency domain representations into a stream of data, wherein the act of scaling is based on a quality metric correlating with the quality of the image;

means for compiling at least one group of data from the stream data that may be represented as a16x16 block;

means for dividing the 16x16 group of data into groups that may be represented as four 8x8 blocks; and

means for serializing each of the four 8x8 blocks of data.

[c24] 24. The apparatus set forth in Claim 23, wherein the act of transforming performs a Discrete Cosine Transform.

[c25] 25. The apparatus set forth in Claim 23, wherein the act of transforming performs a Discrete Cosine Transform followed by a Differential Quad-tree Transform.

[c26] 26. The apparatus set forth in Claim 23, where the color components are Y, Cb and Cr color components.

[c27] 27. The apparatus set forth in Claim 26, wherein the Y, Cb and Cr color components are separated into even and odd color components.

[c28] 28. In a digital cinema system, an apparatus configured to serialize frequency based image data, the apparatus comprising:

a compiler configured to compile at least one group of data that may be represented as a16x16 block;

a divider configured to divide the group of data into groups that may be represented as four 8x8 blocks;

a serializer configured to serialize each of the four 8x8 blocks of data.

[c29] 29. The apparatus set forth in Claim 28, wherein the serializer further comprises a zig-zag scanner configured to zig-zag scan each of the four 8x8 blocks of data.

[c30] 30. The apparatus set forth in Claim 28, wherein the serializer further comprises a vertical scanner configured to vertically scan each of the four 8x8 blocks of data.

[c31] 31. The apparatus set forth in Claim 28, wherein the serializer further comprises a horizontal scanner configured to horizontally scan each of the four 8x8 blocks of data.

[c32] 32. The apparatus set forth in Claim 28, wherein the compiler is configured to compile a frame of data that may be represented as a plurality of 16x16 blocks.

[c33] 33. The apparatus set forth in Claim 28, where the frequency based image data is separated into Y, Cb and Cr color components.

[c34] 34. The apparatus set forth in Claim 33, wherein the Y, Cb and Cr color components are further separated into even and odd color components.

[c35] 35. In a digital cinema system, an apparatus configured to compress a digital image, the image comprising pixel data, the apparatus comprising:

a reader configured to read a group of pixel data;

a generator configured to generate a block size assignment to divide the group of pixel into sub-blocks of pixel data;

a transformer configured to transform the sub-blocks of pixel data into corresponding frequency domain representations;

a scaler configured to scale the frequency domain representations into a stream of data, wherein the act of scaling is based on a quality metric correlating with the quality of the image;

a compiler configured to compile at least one group of data from the stream data that may be represented as a16x16 block;

a divider configured to divide the 16x16 group of data into groups that may be represented as four 8x8 blocks; and

a serializer configured to serialize each of the four 8x8 blocks of data.

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